

Materials Salvaged Through Deconstruction
Case Study: Riverdale Village Apartments

Table with 2 columns: Item, Quantity. Row 1: 2,000 sq. ft., masonry/wood construction. Rows 2-11: Oak strip hardwood flooring (950 square feet), Framing lumber (400), Sheathing boards (475), Brick (5500), Windows (24), Metals (2.2 tons), Miscellaneous (12, 20, 62 tons, 3.5 tons), Total amount salvaged (96.5 tons), Total salvage rate (76%).

If 25 percent of the buildings demolished every year were deconstructed, approximately 20 million tons of debris could be diverted from landfills. The information listed in this brochure can help you discover the economic and environmental opportunities that deconstruction can represent.



Disassembly of 1x6 pine roof deck.

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REFERENCES

Refer to the sources listed below for general information on deconstruction:

- The Smart Growth Network at www.smartgrowth.org, or contact Robin Snyder at US EPA at (202) 260-8331. The Smart Growth Network is coordinated by the US EPA’s Urban and Economic Development Division.
- The HomeBase Hotline at (800) 898-2842. Operated by the NAHB Research Center or www.nahbrc.org.
- The Used Building Material Association represents non-profit and for-profit organizations involved in the acquisition and/or redistribution of used building materials. Contact UBMA at (204) 947-0848 or http://ubma.pangea.ca.
- The Construction Materials Recycling Association addresses the needs and concerns of the construction materials recycling industry. Contact Bill Turley at (630) 548-4510; e-mail: turley@xsite.net.

Although hundreds of examples exist, a few of the high-profile case studies are listed below.

- Riverdale Village Apartments. A 2,000 square foot, masonry/wood apartment was deconstructed in 1997 by Stop Corporation and the NAHB Research Center as an EPA-funded case study/analysis of the issues surrounding deconstruction. The comprehensive report includes a detailed labor analysis, a cost comparison to demolition, a discussion of environmental and regulatory issues facing the deconstruction industry, and a building material inventory form. Contact Peter Yost or Eric Lund at (301) 249-4000. The entire report is available on the internet at www.smartgrowth.org.
- Presidio Building #901. A 9,180 square foot, wood-constructed building was deconstructed in 1996 by Beyond Waste and San Francisco Community Recyclers. Contact Kevin Drew at (415) 731-6720. The entire report is available on the internet at www.smartgrowth.org.
- Port of Oakland, Building #733. A three-acre, wood-constructed warehouse was deconstructed in 1996-1997 by Youth Employment Partnership as a job training site for at-risk youth. Contact Dennis Smith at (510) 533-3447.
- Ottawa Buildings (house, barn and garage). Three separate buildings (totalling 9,700 square feet) consisting of concrete and wood construction were deconstructed in 1996 by dDesign consultants and Goode-X Equipment Rentals. Contact Vince Catalli at (613) 230-5776 and Doug Goode at (613) 749-8556.

In addition to the contract language used for specific projects, model contract language has also been developed. A few examples of both are listed below.

- Model contract language has been prepared by the UC Santa Cruz Extension-Business Environmental Assistance Center and the Fort Ord Reuse Authority. Contact Ann Schneider at (800) 799-2322 and Stan Cook at (408) 883-3672.
- WasteSpec - WasteSpec is a set of model specifications for construction waste reduction, reuse, and recycling prepared by the Triangle J Council of Governments. Contact Judy Kincaid at (919) 558-9343.
- The Request for Proposal and contract for deconstruction at Naval Air Station, Alameda, CA was prepared by the East Bay Conversion and Reinvestment Commission. Contact Lorraine Giordano at (510) 834-6928.
- The Request for Proposal used by Defence Construction Canada for the demolition of buildings can be obtained by contacting Ron de Vries at (613) 998-0468 (fax). The bid document includes an evaluation matrix for received bids.
- The City of Los Angeles has prepared a Solid Resources Management specification which outlines the procedures for handling materials generated during building removal and new construction projects. Contact the Integrated Solid Waste Management Office at (213) 847-0143. The specification (also available on diskette) includes a worksheet for developing a resources management plan. See also: www.ciwmb.ca.gov.
- The contract to remove the Presidio building was prepared by the Golden Gate National Recreation Area. Contact Tom Fischer at (415) 561-4457.



Census Bureau data indicate that approximately 245,000 dwelling units and 45,000 non-residential units are demolished every year, creating approximately 74 million tons of debris. Deconstruction is an approach to building removal that can convert this refuse into resources.



CAN YOU APPLY A NEW APPROACH TO BUILDING REMOVAL ON YOUR NEXT PROJECT?



400 Prince George's Boulevard, Upper Marlboro, MD 20774-8731
http://www.nahbrc.org

WHAT IS DECONSTRUCTION?

Deconstruction is a new term to describe an old process—the selective dismantling or removal of materials from buildings prior to or instead of conventional demolition. Deconstruction is an alternative method of building removal which can offer **economic and environmental benefits**.

Census Bureau data indicate that approximately 245,000 dwelling units and 45,000 non-residential units are demolished every year, creating approximately 74 million tons of debris. Deconstruction is an approach to building removal that can convert this refuse into resources, and this brochure will help you determine how and when to do so.



Removal of entire stair units with oak treads and risers.

WHAT ARE THE BENEFITS OF DECONSTRUCTION?

**Lower building removal costs** - Deconstruction can cost less than demolition because of the value of the salvaged materials and the avoided disposal costs.

**Reduced impact to site** - Deconstruction results in significantly greater protection to the local site, including the soil and vegetation. In addition, deconstruction creates less dust and noise than demolition.

**Conserved landfill space** - Deconstruction can divert up to 90 percent of a building into reuse or recycling. This can play an important role in helping some states reach their recycling goals, as well as helping private companies in their marketing or public relations efforts.

**Job creation** - Manual disassembly of buildings offers an excellent opportunity to identify and train minimally-skilled workers with an aptitude and interest in the building trades. Job creation is often an important policy consideration for federal agencies, as well as for communities interested in developing economic opportunities.

WHICH BUILDINGS ARE APPROPRIATE FOR DECONSTRUCTION?

The most important part of assessing the feasibility of deconstruction is a detailed inventory of how and of what the building is made. In general, buildings exhibiting one or more of the following characteristics are likely to be good deconstruction candidates:

- wood-framed with **heavy-timbers and beams**, or with unique woods such as douglas fir, American chestnut, and old growth southern yellow pine;
- constructed with high-value **specialty materials** such as hardwood flooring, multi-paned windows, architectural molding, and unique doors or plumbing/electrical fixtures;
- constructed with **high-quality brick** laid with low-quality mortar (to allow relatively easy break-up and cleaning); or
- **structurally sound**, i.e, generally weather-tight to minimize rotted and decayed materials.

Buildings constructed mainly of **concrete and/or steel** may be good candidates for partial deconstruction, or the “stripping” of salvageable materials. Stripping out these materials may make it easier to recycle the concrete and steel as well.

Cost Savings With Deconstruction  
Case Study: Presidio Building #901

9,180 square feet, wood construction		
Costs/Premiums	Deconstruction	Demo Bid
Labor	- \$33,000	---
Equipment and Disposal	- \$12,000	---
Administration	- \$8,000	---
Total Expenses	- \$53,000	- \$16,800
Salvage Value of Material	+ \$43,660	---
Net Cost	- \$9,340	- \$16,800
Savings with deconstruction	\$7,460	

DECONSTRUCTION

Deconstruction is an alternative method of building removal which can offer **economic and environmental benefits**.

WHAT ARE THE STEPS IN PLANNING FOR DECONSTRUCTION?

1) Providing Adequate Time

Deconstruction in almost all cases requires more time than demolition — during the planning phase as well as the building removal phase. Depending on the type of building and the size of the crew, deconstruction can take two to ten times longer than conventional demolition.

2) Permitting and Environmental Assessments

The steps required to obtain a permit and identify hazardous materials are similar for demolition and deconstruction. To minimize liability related to environmental conditions, property owners typically make reasonable efforts to identify hazardous materials. This is often done by conducting environmental assessments. For residential properties of four units or less there are no federal environmental assessment standards; however, state or local requirements may exist.



Salvaged studs reused for wall framing in another project.

3) Building Inventory

A detailed building materials inventory is necessary to estimate the quantity of materials that can be salvaged. Such an analysis requires inspection of every component, focusing on its condition and the manner in which it is secured to the structure. The inventory will identify construction methods and fasteners, as well as hazardous materials not available for inspection during the non-invasive environmental assessments. All of these aspects of the building will affect the cost-effectiveness of salvage.

4) Hazardous Materials Abatement

Both the Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) have federal regulations governing the management of asbestos-containing materials (ACM) and lead-based paint (LBP) in buildings. In general, EPA regulations for ACM and LBP contain no specific language that would require different hauling or disposal procedures for deconstruction and demolition. By contrast, OSHA worker protection requirements for both ACM and LBP currently place a greater burden on deconstruction than demolition because of the manual labor involved (efforts are underway which should ease this burden). Be aware that state and local regulations must meet and can exceed the requirements of federal regulations. For more information on these issues see the US EPA contact in the References section of this brochure.

5) Contracting Process

Deconstruction requires a contractor with an understanding of demolition, construction, and the efficient flow of materials. Selecting this contractor is the most critical step in the process, and the property owner should carefully draft a Request for Proposal/Invitation to Bid to solicit key information from bidders. While the “References” section of this brochure lists sources for sample contracts, consider the following items as well:

- Match the **capabilities and approach** of the contractor to the characteristics of the building. Large buildings (more than three stories) and small masonry buildings will probably require heavy machinery for safe and cost-effective structural salvage. Light-framed, smaller buildings can often be most cost-effectively disassembled with manual labor;
- Require the submittal of a **Resources Management Plan** which outlines how the specified material recovery goals will be achieved;
- Specify separate goals for **reuse and recycling**, and consider giving reuse greater relative weight;
- Provide as much **assistance** as possible to reach the material recovery goals. For example, provide a list of reuse and recycling strategies/outlets located near the site; and
- Divide the building removal into **separate contracts**, e.g., hazardous material abatement, building disassembly, processing of materials,and final site restoration. Some contractors may specialize in one of these areas.

6) Marketing the Salvaged Materials

Deconstruction requires either a ready market for the salvaged materials or the ability to warehouse the materials (on-site or off-site) until they are sold. Many factors — including the types of materials, time of year, the strength of the local economy, and the current retail price of building materials — will affect the net value of the salvaged materials. Different approaches include:

- Direct marketing to retailers/end users;
- Marketing through a materials broker;
- Selling at regional used materials auctions;
- Conducting a site sale; and
- Specifying in new construction or rehabilitation projects.



Salvaged framing lumber stockpiled and ready for site sale.